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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/700,295	11/03/2003	Michael E. Badding	SP03-079A	6519

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EXAMINER	
WALKER, KEITH D	

ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 04/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/700,295	BADDING ET AL.	
	Examiner	Art Unit	
	Keith Walker	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) *13-28* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4-12* is/are rejected.

7)☒ Claim(s) *3* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Remarks

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/17/06 has been entered.

Claims 1-28 are pending in the application with claims 13-28 withdrawn.

Claims 1-12 are pending examination.

Correction of the drawings upon allowance is noted.

Drawings

The amended drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters 56, 56' and a question mark "?" have both been used to designate the same interconnect piece. It is unclear from the specification what is described by the "?".

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement-drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the

changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and In *re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-12 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 10-16 & 23-25 of copending Application No. 10/611,507. Although the conflicting claims are not identical, they are not patentably distinct from each other because both inventions are drawn to a non-porous electrolyte sheet with varied thicknesses. Both electrolyte sheets are made from a doped stabilized zirconia.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1, 2 & 4-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Publication 2003/0165732 A1 (McElroy) in view of US Publication 2001/0044043 (Badding) and evidenced by US Patent 4,874,678 (Reichner).

Regarding claims 1, 2, 4-6 & 9 McElroy teaches a ceramic electrolyte with at least one non-uniform surface, where the surface is textured with a plurality of protrusions having a height of 0.5 to 2.5 microns (Para. [0187]).

When using the electrolyte with one non-uniform surface, the orientation of the non-uniform surface towards which electrode is not discussed. Since only two choices exist, pointing the textured side to the anode or the cathode and the orientation is seen as a rearrangement of parts, it would have been obvious to one having ordinary skill in the art at the time the invention was made to change the orientation of the electrolyte sheet to optimize the performance of the fuel cell, since it has been held that rearranging parts of an invention involves only routine skill in the art (*MPEP 2144.04*). As pointed out in applicant's specification, it is known to have a higher flow of air across the cathode, creating greater compressive force on the high-pressure side (airside) and

a greater tensile force on the fuel side. So it is inherent that the fuel cell, taught by Badding, has a predominately compressive force on the airside and tensile force on the fuel side.

Regarding claim 10, a ceramic electrolyte comprising yttria stabilized zirconia (Para. [0189]).

McElroy doesn't directly teach to the thickness of the electrolyte or to the electrolyte having a substantially non-porous body.

Regarding claims 7-9, 11 & 12, Badding teaches the use of a flexible ceramic electrolyte with the thickness in the range of 5-20 microns (Para. [0042]). The electrolyte is described as a dense material ([0003]), while the electrodes are described as a porous material and since the electrolyte of the prior art is made from the same material as the instant application, it would inherently have similar features such as a non-porous body. Furthermore, it would be obvious to one skilled in the art to use a homogeneously non-porous electrolyte to prevent reactant crossover.

The motivation to modify the electrolyte thickness of McElroy is to enhance the thermal shock resistance and electrochemical performance.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of McElroy with the electrolyte thickness as taught by Bedding, since it would have enhanced the thermal shock resistance and electrochemical performance.

As mentioned above, McElroy does not speak directly to the electrolyte body being non-porous but does teach using yttria-stabilized zirconia ([0189]). Badding

teaches a typical solid oxide fuel cell including a dense electrolyte of yttria-stabilized zirconia sandwiched between porous electrodes ([0003-0004]). By describing the electrode as being porous and the electrolyte as dense, one of ordinary skill in the art would infer this to be a substantially non-porous body. Reichner also teaches a non-porous solid electrolyte that is typically yttria-stabilized zirconia (4:12-15). As evidenced by Reichner, yttria stabilized zirconia is a substantially non-porous electrolyte.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to use a substantially non-porous electrolyte, such as yttria stabilized zirconia, for the fuel cell as taught by McElroy since the non-porous body would prevent reactant crossover.

2. Claims 1, 2 & 4-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP Publication 05-258756 (Kato) in view of US Publication 2003/0165732 A1 (McElroy).

Kato teaches texturing only oxidant surface of a fuel cell electrolyte (Abstract). The electrolyte surface is etched out and a catalyst of platinum is deposited in the crevices to expand the oxidation-reduction reaction (Figs. 1-3, [0021-0023]). The thickness of the electrolyte sheet is 50-200 microns ([0009]). As pointed out in applicant's specification, it is known to have a higher flow of air across the cathode creating greater compressive force on the high-pressure side (airside) and a greater tensile force on the fuel side. So it is inherent that the electrolyte taught by Kato that has the same characteristics as the instant application and is arranged in a similar

manner, experiences the same predominately compressive force on the airside and tensile force on the fuel side.

Regarding claims 8, 9 & 11 the thickness of the electrolyte sheet is a design choice and varying the thickness of the electrolyte to reduce the internal resistance and vary the overall thickness of the fuel cell would be obvious to one skilled in the art. Claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result, which is different in kind and not merely in degree from the results of the prior art (MPEP 2144.08).

Kato is silent to the thickness variations and to the use of a ceramic electrolyte.

The teachings of McElroy as discussed above are incorporated herein.

McElroy teaches a ceramic electrolyte comprising yttria-stabilized zirconia with at least one non-uniform surface, where the surface is textured with a plurality of protrusions having a height of 0.5 to 2.5 microns ([0187, 0189]). While the electrolyte between the two references is different, the teachings of texturing the surface of an electrolyte to produce more reactive surface area and increase the adhesion is transferable between the electrolyte types. Therefore it would be obvious to one skilled in the art to look to a solid oxide electrolyte for teachings towards the amount of roughness for an electrolyte sheet.

Allowable Subject Matter

Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art of record does not teach an electrolyte

layer having a thicker middle portion that tapers off toward the edges of the electrolyte sheet.

Response to Arguments

Applicant's arguments, filed 11/21/05, with respect to the rejection(s) of claim(s) 1, 2, 4-12 under US Patent 6,428,920 (Badding) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Kato.

Applicant argues that the electrolyte of McElroy and Badding is not a substantially homogeneously non-porous body. As discussed above, the electrolyte taught by Badding is a dense yttria-stabilized zirconia and as evidenced by Reichner, this electrolyte is substantially homogeneously non-porous. Since the electrolytes of the prior art are made from the same material and in a similar manner as the electrolyte of the instant application, the properties of the two electrolytes would inherently be the same.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keith Walker whose telephone number is 571-272-3458. The examiner can normally be reached on Mon. - Fri. 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KW

GREGG CANTELMO
PRIMARY EXAMINER

4/3/06